

What is claimed is:

Sub A7
1. A method of fabricating a semiconductor device comprising the steps of:

forming a first crystalline region by irradiating a laser beam to an amorphous semiconductor film while relatively moving the laser beam with respect to said amorphous semiconductor film; and

forming a second crystalline region by irradiating the laser beam to a region including a portion of the first crystalline region of the amorphous semiconductor film formed with the first crystalline region by relatively moving the laser beam with respect to said region including a portion of the first crystalline region;

wherein a wavelength of the laser beam falls in a range of 370 nm through 650 nm.

2. A method of fabricating a semiconductor device comprising the steps of:

forming a first crystalline region by irradiating a laser beam having a shape at an irradiated face or a vicinity thereof in a linear or a rectangular shape to an amorphous semiconductor film while relatively moving the laser beam with respect to said amorphous semiconductor film; and

forming a second crystalline region by irradiating the laser beam to a region including a portion of the first

crystalline region of the amorphous semiconductor film formed with the first crystalline region while relatively moving the laser beam with respect to said region including a portion of the first crystalline region;

5 wherein a wavelength of the laser beam falls in a range of 370 nm through 650 nm.

3. A method of fabricating a semiconductor device comprising the steps of:

10 forming a first crystalline region by irradiating a laser beam having a shape at an irradiated face or a vicinity thereof in a linear or rectangular shape to an amorphous semiconductor film while relatively moving the laser beam in a short direction of the laser beam with respect to said amorphous semiconductor
15 film; and

 forming a second crystalline region by irradiating the laser beam to a region including a portion of the first crystalline region of the amorphous semiconductor film formed with the first crystalline region while relatively moving the
20 laser beam in the short direction of the laser beam with respect to said region including a portion of the first crystalline region;

 wherein a wavelength of the laser beam falls in a range of 370 nm through 650 nm.

25

4. A method of fabricating a semiconductor device comprising:

a first step of forming a first crystalline semiconductor film by partially crystallizing an amorphous semiconductor film by a heating treatment; and

a second step of forming a second crystalline semiconductor film by irradiating a laser beam to the crystalline semiconductor film;

wherein the second step comprises the steps of:

forming a first crystalline region by irradiating the laser beam to the first crystalline semiconductor film while relatively moving the laser beam with respect to the first crystalline semiconductor film; and

forming a second crystalline region by irradiating the laser beam to a region including a portion of the first crystalline region of the first crystalline semiconductor film formed with the first crystalline region while relatively moving the laser beam with respect to said region including a portion of the first crystalline region of the first crystalline semiconductor film; and

wherein a wavelength of the laser beam falls in a range of 370 nm through 650 nm.

5. A method of fabricating a semiconductor device comprising:

a first step of forming a first crystalline semiconductor film by partially crystallizing an amorphous semiconductor film by a heating treatment; and

a second step of forming a second crystalline semiconductor film by irradiating a laser beam having a shape at an irradiated face or a vicinity thereof in a linear or a rectangular shape to the first crystalline semiconductor film;

wherein the second step comprises the steps of:

forming a first crystalline region by irradiating the laser beam to the first crystalline semiconductor film by relatively moving the laser beam with respect to the first crystalline semiconductor film; and

forming a second crystalline region to a region including a portion of the crystalline region of the first crystalline semiconductor film formed with the first crystalline region by relatively moving the laser beam with respect to said region including a portion of the crystalline region of the first crystalline semiconductor film; and

wherein a wavelength of the laser beam falls in a range of 370 nm through 650 nm.

6. A method of fabricating a semiconductor device comprising:

a first step of forming a first crystalline semiconductor film by partially crystallizing an amorphous semiconductor film

by a heating treatment; and

5 a second step of forming a second crystalline semiconductor film by irradiating a laser beam having a shape at an irradiated face or a vicinity thereof in a linear or a rectangular shape to the first crystalline semiconductor film while relatively moving the laser beam in a short direction of the laser beam with respect to the first crystalline semiconductor film;

wherein the second step comprises the steps of:

10 forming a first crystalline region by irradiating the laser beam to the first crystalline semiconductor film while relatively moving the laser beam in the short direction of the laser beam with respect to the first crystalline semiconductor film; and

15 forming a second crystalline region by irradiating the laser beam to a region including a portion of the first crystalline region of the first crystalline semiconductor film formed with the first crystalline region while relatively moving the laser beam in the short direction of the laser beam with respect to the region including a portion of the first crystalline region of the first crystalline semiconductor film; and

20 wherein a wavelength of the laser beam falls in a range of 370 nm through 650 nm.

25

7. The method of fabricating a semiconductor device according to claim 1, wherein a crystalline performance of the first crystalline region, a crystalline performance of the second crystalline region and a crystalline performance of a region overlapped with the first crystalline region and the second crystalline region are the same.

8. The method of fabricating a semiconductor device according to claim 2, wherein a crystalline performance of the first crystalline region, a crystalline performance of the second crystalline region and a crystalline performance of a region overlapped with the first crystalline region and the second crystalline region are the same.

9. The method of fabricating a semiconductor device according to claim 3, wherein a crystalline performance of the first crystalline region, a crystalline performance of the second crystalline region and a crystalline performance of a region overlapped with the first crystalline region and the second crystalline region are the same.

10. The method of fabricating a semiconductor device according to claim 4, wherein a crystalline performance of the first crystalline region, a crystalline performance of the second crystalline region and a crystalline performance of a

region overlapped with the first crystalline region and the second crystalline region are the same.

11. The method of fabricating a semiconductor device
5 according to claim 5, wherein a crystalline performance of the first crystalline region, a crystalline performance of the second crystalline region and a crystalline performance of a region overlapped with the first crystalline region and the second crystalline region are the same.

12. The method of fabricating a semiconductor device
according to claim 6, wherein a crystalline performance of the first crystalline region, a crystalline performance of the second crystalline region and a crystalline performance of a region overlapped with the first crystalline region and the second crystalline region are the same.

13. The method of fabricating a semiconductor apparatus
according to claim 1, wherein the semiconductor device is a
20 liquid crystal display apparatus or an EL display apparatus.

14. The method of fabricating a semiconductor apparatus
according to claim 2, wherein the semiconductor device is a liquid crystal display apparatus or an EL display apparatus.

15. The method of fabricating a semiconductor apparatus according to claim 3, wherein the semiconductor device is a liquid crystal display apparatus or an EL display apparatus.

5 16. The method of fabricating a semiconductor apparatus according to claim 4, wherein the semiconductor device is a liquid crystal display apparatus or an EL display apparatus.

17. The method of fabricating a semiconductor apparatus according to claim 5, wherein the semiconductor device is a liquid crystal display apparatus or an EL display apparatus.

18. The method of fabricating a semiconductor apparatus according to claim 6, wherein the semiconductor device is a liquid crystal display apparatus or an EL display apparatus.

19. The method of fabricating a semiconductor device according to Claim 1, wherein the semiconductor device is a device selected from the group consisting of: a portable telephone, a video camera, a digital camera, a projector, a goggle type display, a personal computer, a DVD player, an electronic book and a portable information terminal.

20. The method of fabricating a semiconductor device according to claim 2, wherein the semiconductor device is a

device selected from the group consisting of: a portable telephone, a video camera, a digital camera, a projector, a goggle type display, a personal computer, a DVD player, an electronic book and a portable information terminal.

5

21. The method of fabricating a semiconductor device according to claim 3, wherein the semiconductor device is a device selected from the group consisting of: a portable telephone, a video camera, a digital camera, a projector, a goggle type display, a personal computer, a DVD player, an electronic book and a portable information terminal.

10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
105
110
115
120
125
130
135
140
145
150
155
160
165
170
175
180
185
190
195
200
205
210
215
220
225
230
235
240
245
250
255
260
265
270
275
280
285
290
295
300
305
310
315
320
325
330
335
340
345
350
355
360
365
370
375
380
385
390
395
400
405
410
415
420
425
430
435
440
445
450
455
460
465
470
475
480
485
490
495
500
505
510
515
520
525
530
535
540
545
550
555
560
565
570
575
580
585
590
595
600
605
610
615
620
625
630
635
640
645
650
655
660
665
670
675
680
685
690
695
700
705
710
715
720
725
730
735
740
745
750
755
760
765
770
775
780
785
790
795
800
805
810
815
820
825
830
835
840
845
850
855
860
865
870
875
880
885
890
895
900
905
910
915
920
925
930
935
940
945
950
955
960
965
970
975
980
985
990
995

22. The method of fabricating a semiconductor device according to claim 4, wherein the semiconductor device is a device selected from the group consisting of: a portable telephone, a video camera, a digital camera, a projector, a goggle type display, a personal computer, a DVD player, an electronic book and a portable information terminal.

15

23. The method of fabricating a semiconductor device according to claim 5, wherein the semiconductor device is a device selected from the group consisting of: a portable telephone, a video camera, a digital camera, a projector, a goggle type display, a personal computer, a DVD player, an electronic book and a portable information terminal.

20

25

24. The method of fabricating a semiconductor device according to claim 6, wherein the semiconductor device is a device selected from the group consisting of: a portable telephone, a video camera, a digital camera, a projector, a goggle type display, a personal computer, a DVD player, an electronic book and a portable information terminal.

25. The method of fabricating a semiconductor device according to claim 1, wherein said laser beam is a laser beam selected from the group consisting of: a second harmonic of a YAG laser, a second harmonic of a YVO₄ laser and a second harmonic of a YLF laser.

26. The method of fabricating a semiconductor device according to claim 2, wherein said laser beam is a laser beam selected from the group consisting of: a second harmonic of a YAG laser, a second harmonic of a YVO₄ laser and a second harmonic of a YLF laser.

27. The method of fabricating a semiconductor device according to claim 3, wherein said laser beam is a laser beam selected from the group consisting of: a second harmonic of a YAG laser, a second harmonic of a YVO₄ laser and a second harmonic of a YLF laser.

28. The method of fabricating a semiconductor device according to claim 4, wherein said laser beam is a laser beam selected from the group consisting of: a second harmonic of a YAG laser, a second harmonic of a YVO₄ laser and a second harmonic of a YLF laser.

29. The method of fabricating a semiconductor device according to claim 5, wherein said laser beam is a laser beam selected from the group consisting of: a second harmonic of a YAG laser, a second harmonic of a YVO₄ laser and a second harmonic of a YLF laser.

30. The method of fabricating a semiconductor device according to claim 6, wherein said laser beam is a laser beam selected from the group consisting of: a second harmonic of a YAG laser, a second harmonic of a YVO₄ laser and a second harmonic of a YLF laser.